Appendix D: Description of Natural Resources and Special Landscape Areas

Examination of existing field surveys of Loess Hills prairies, forests, and topographic features followed by application of Geographical Information System (GIS) technology allowed researchers preparing this Study to gain new insights into distribution of these resources. Their examinations also prompted the identification of 12 Special Landscapes that stood out as clusters of exemplary prairie and geological/topographic features.

Techniques Used: Studies conducted by The Nature Conservancy (White and Kerr 1981; Prior 1992; Hickey and Watson 1992; Selby 2000) were examined in depth. The studies conducted prior to 2000 sought to identify prairie complexes through the use of color-infrared aerial images and low-altitude aerial reconnaissance, followed by site visits to selected complexes. These earlier studies also considered major geological features (exemplary topographic features, unusual deposits, and the like, including those described in Szymkowicz and Ruhe's (1981) and Ruhe et al's (1983) reports on potential National Natural Landmarks). The most recent inventory (Selby 2000), which was based solely on aerial photograph interpretation, provided the first comprehensive delineation of prairies throughout the Loess Hills region. Selby's highly detailed GIS mapping provides a conservative estimate of prairie coverage; prairies indistinguishable because they are overgrazed or otherwise degraded were not mapped. Thus, total prairie coverage probably lies somewhere between Selby's calculations and an earlier, much coarser GIS mapping of total grassland coverage (Iowa Department of Natural Resources 1992), which included planted grasslands of exotic species as well as prairies. All analyses completed to date are biased toward prairies without equal consideration of high-quality mature forests.

Resulting descriptions of these 12 Special Landscape Areas (SLAs), as well as of the Loess Hills Landform Region as a whole, are included below. Statistics on plant community coverage and land ownership status for the entire landform region as well as each SLA, resulting from the GIS analysis, are listed in Table D-1 of this Appendix.

The boundary of the landscape area depicted on maps utilized in this report are generalized boundaries, intended for interpretive use. The landform region boundaries and the boundaries of the 12 SLA's do not have legal standing.

Natural Resources of the Loess Hills Landform Region:

Remaining prairies are nearly ubiquitous, threading through the Loess Hills from north to south and east to west. These mapped prairies cover a minimum of 22,249 acres (3% of the Loess Hills). Additional prairies would likely be found among the 327,339 acres of all grasslands that cover 50% of the landform region. These figures demonstrate that prairies remain significant ecosystems throughout this special region. Their extent and interconnectedness magnifies their value as migration corridors.

The prairies change in shape and extent from north to south. They are broadest, most abundant, extensive, and flow over entire hillsides in the drier north (in Plymouth County occupying nearly 10% of the local landform region), while they narrow to cover only thin ridgetops and uppermost slopes in the moister south (where their cover is only 2-3%). Their characteristics, quality, and use also vary with location. The smaller ridgeline prairies of the southern hills, which are protected from grazing and other disturbances by their remoteness and the rugged terrain, may be in good to excellent condition. The more easterly prairies and others on less rugged terrain, in contrast, often are heavily grazed. The long, thin shape of many remaining prairies makes them especially susceptible to invasion of surrounding woody species and emphasizes their need for intensive management.

Twelve special landscapes, defined on the basis of biological, geological, and topographic considerations, encompass a total of 99,997 acres and are distributed from the northern to the southern tips of Iowa's Loess Hills. These landscapes string along the western margins of the Loess Hills, along the Missouri River Valley, where the loess is deepest, the topographic relief is greatest, and the exposure to sun and wind create very dry environments that favor mid-grass prairie communities. Within this string of blufflands, the Special Landscapes highlight those areas where the Loess Hills are the highest and most articulated; here rugged topography has served to create the greatest scenic diversity and to protect inaccessible prairies from intensive livestock grazing and other human-induced disturbance. In many other places, both along the bluffline and toward the east, the Loess Hills topography is less extreme and thus prairies have been more impacted by grazing cattle or lost altogether to rowcrop agriculture.

Detailed GIS mapping revealed that 19 percent of the Special Landscapes' total acreage (18,745 acres) is native prairie. Coarser mapping indicated that 58 percent (58,008 acres) of the Special Landscapes is "grassland" of any type, including pastures of brome, alfalfa, orchard grass or other species, hayfields, and prairies and other areas with and without shrubs or scattered trees. Some of these grasslands likely are additional overgrazed or degraded prairies that were not identified as such in the detailed, conservative prairie map. A third of the total acreage (29 percent) is covered by forests, woodlands, and dense shrublands. Most of the rest (12 percent) is planted to row crops. The distribution of state-listed species throughout the Special Landscapes displays the value of Special Landscapes as a composite in representing the region's flora, as well as the natural variation of species composition from north to south.

As of September, 2000, 17 percent of the total acreage of these Special Landscapes (17,059 acres) was in some sort of protected status, being owned either by state or county government units or by The Nature Conservancy. The same percentage of prairies located within the Special Landscapes is under some form of protected status. 82,938 acres are privately owned.

Descriptions of the Twelve Special Landscapes:

1. Plymouth North

Plymouth North Special Landscape, nearly 10,000 acres in size, lies at the far northern terminus of the Loess Hills landscape region. Here, in Plymouth County, long unbroken ridge crests and a rolling, billowy topography reflect the shallower loess depth and the presence of underlying Cretaceous bedrock in the far-northern Hills. Sweeping vistas are afforded by the large, undeveloped grasslands that cover 80 percent of the land's surface; woody vegetation covers a meager 13 percent of the site. Broad, expansive, and interconnected prairies dominate a full quarter of the land. These large northern prairies host a large number of state-listed species and western species near their eastern distributional limits. The site is the nation's most easterly location of the prairie rattlesnake and the species' only known location in Iowa.

This remarkably open and undeveloped site, with its large roadless tracts, is today a major focus of Nature Conservancy (TNC) preservation and research activities. Altogether 39 percent of the Special Landscape is protected in conservation ownership, with the majority of that held in TNC's 3047-acre Broken Kettle Grasslands. The Woodbury County Conservation Board owns another 806-acre preserve, Five Ridge Prairie, which is also one of four Loess Hills sites to be designated an Iowa State Preserve and receive the strong legal protection afforded by that status. These preserves protect nearly 60 percent of the site's prairies.

2. Plymouth South

The 13,549-acre Plymouth South site, straddling the Plymouth-Woodbury County line and extending from the Plymouth North Special Landscape down to the northwestern edge of Sioux City, resembles Plymouth North in many ways. Plymouth South was selected for its similar biological traits (expanses of open grasslands, large numbers of rare species) and geological qualities (impressive vistas of classic loess topography and the broad plains of the Big Sioux and Missouri rivers beyond). Prairies cover a third of the land's surface. In addition, seeps and moist valleys in the site's southern portion have produced interesting woodland communities, some of which are mature, high-quality, diverse forests.

A total of nine percent of this parcel is publicly owned, the remaining 12,369 acres are privately owned. Nearly all of the public ownership is within woodland-dominated Stone State Park, which protects only four percent of the site's prairies. Mt. Talbot State Preserve, recognized for its geological and biological qualities, occupies the northern portion of the park and contains high-quality, diverse prairies. The Woodbury County Conservation Board owns a small acreage around the Dorothy Pecaut Nature Center, as well as the Riverside Bluffs site. Most of the prairies and woodlands to the north, in Plymouth County, remain on undeveloped land in pastoral agricultural use. The prairies are threatened by suburban homes that are fingering their way through the natural areas. The site's combination of high natural resource value, vulnerability to urban expansion, and strong management needs make this a prime area for increased protection efforts.

3. Luton

This small 1,941-acre open, grassy, bluff-edge site in central Woodbury County contains broad, continuous prairies unbroken by farm fields. Such sites are rare in Woodbury County, where intensive agricultural use has altered most of the native vegetation. Prairies cover about a third of the site. All are heavily grazed; the site lacks the undisturbed prairie remnants found in other Special Landscapes. Woody vegetation covers about a fifth of the site. All land in this parcel is in private ownership and used for agricultural purposes.

4. Grant Center

This 5,364-acre rugged triangular segment of the Loess Hills straddles the Woodbury-Monona County line. Here in the north-central Loess Hills, the loess is deep, landform characteristics are well developed, and the topography spectacular. Expansive, interconnected, undeveloped ridgetop and sideslope prairie areas cover nearly a quarter of the site. Prairies are fair to high quality. Woody vegetation covers a mere 14 percent of the Special Landscape. Topographically, long, high, narrow summits, open and often horizontally notched by catsteps, feed into branching spurs and steep-sloped deep ravines.

None of the area is in protected status. All of the land is used for agriculture, with few roads or structures penetrating the site. However the site was one of three areas that Ruhe et al (1983) recommended for National Natural Landmark (NNL) status. Although this site's qualities were described as similar to those of the other two proposed NNL sites, Grant Center was not selected because of its smaller size.

5. Turin

The 15,049-acre Turin area is located in the heart of the Loess Hills in central Monona County, where loess deposits are deepest and the classic Loess Hills terrain is best developed. Extensive concentrations of broad, large, interconnected prairies roll over the crests of sharp summits and high, miles-long, broad ridges as well as down dramatic westerly bluff faces. In all, 2,776 acres (18 percent) of the site is prairie-covered, with some prairies being quite diverse and high in quality. Woody growth covers nearly a quarter of the site. This site was cited in all geological surveys for its exemplary topographic and typical deep loess features, including its 200-foot bluffs with some summits towering 350 feet above the Missouri's floodplain, a high density of incised drainageways, narrow divergent ridges and steep slopes, and steep catstepped slopes.

Nearly a fifth of the site and nearly a fifth of its prairies are publicly owned. Protected landfalls within the Loess Hills Wildlife Area, where prairies have been managed by burning since the mid-1970s. The annual Loess Hills Prairie Seminar, a major natural history educational event, is held here, and two State Preserves (Sylvan Runkel and Turin Loess Hills) fall within the boundaries of the Wildlife Area. Much of the remainder of the site constitutes the Turin Site of the Loess Hills National Natural Landmark; no special management practices accompany that designation.

6. Little Sioux

This very large 23,736-acre Special Landscape in Monona and Harrison Counties has been acclaimed for several geological and biological values. Portions of the nearly 4,000 acres of prairie remain high quality and diverse. Topography is very rugged, with steep western blufflines and 400 feet of local relief in places affording scenic vistas across the Missouri's valley and up and down the Loess Hills. Volcanic ash deposits and other Pleistocene stratigraphic features have inspired scientific investigations in this region since the mid- to late-1800s. Ruhe et al (1983) selected portions of the Special Landscape as his first choice for a Loess Hills National Natural Landmark and recommended that the site also be considered for National Monument status.

About a quarter of the site is in public ownership, with sections of land falling within the Loess Hills State Forest, Gleason-Hubel Wildlife Area, and Murray Hill Scenic Overlook. All told, these public lands protect 18 percent of the prairies. Portions of the Loess Hills National Natural Landmark also fall within this Special Landscape.

7. Mondamin

The 5,394-acre Mondamin site in central Harrison County constitutes a long narrow band of rugged hills along the western edge of the landform region. A third of the land is heavily forested, but good quality prairies cover 13% of the protected high ridgelines.

A fifth of this landscape falls under public ownership (which protects nearly a fifth of the landscape's prairies). Public lands include the Mondamin unit of the Loess Hills State Forest (owned by the Iowa Department of Natural Resources) and Sawmill Hollow Wildlife Area (owned by the Harrison County Conservation Board).

8. Loveland

The long, thin, 3,828-acre Loveland site, stretching from southern Harrison County down into Pottawattamie County, skims the western border of the landform region. The site claims highly visible, high quality prairies (covering around 500 acres) on ridgetops and steep sideslopes and bluffs. However its precipitous slopes with narrow, deep valleys are largely covered with bur oak and other woodlands; woody vegetation claims over half the Special Landscape. The site includes the Loveland Loess geologic type-section, which lies nearby the DOT Scenic Overlook (just north of I-680). The high terraced exposure reveals the internal composition of the Loveland (Illinoian) and Peoria (Wisconsinan) loess deposits (major stratigraphic units) and is often visited by researchers of midcontinental loess deposits.

About a quarter of this area falls within the Hitchcock Nature Area, owned by the Pottawattamie County Conservation Board. The Nature Area preserves about a quarter of the site's prairies. Urban sprawl from nearby Council Bluffs potentially poses a major threat to the region.

9. Council Bluffs North

This 5,021-acre Special Landscape in central Pottawattamie County just north of Council Bluffs boasts large concentrations of prairies capping the topographically prominent narrow, winding, branching ridges. While prairies cover 15 percent of the high, rugged promontory, woodlands (which coat about half of the landscape) cloak the hillsides and form the dominant vegetation.

None of this landscape is in public ownership. Urban sprawl poses a major threat to remaining natural areas, as does the excavation of loess for fill dirt. A large limestone quarry also lies along the northeastern edge of the site.

10. Folsom Point

This 5,936 Special Landscape in Pottawattamie and Mills Counties spans most of the bluffline between Council Bluffs and Glenwood. With portions of the landscape forming a high, rugged range of grassland-capped ridges, the site was selected for its isolated, good-quality prairies and for its distinctive topography. However the site as a whole is heavily forested (woodlands cover about 40 percent of the land). Prairies, covering only 10 percent of the land, are restricted primarily to the ridgetops and highest driest slopes.

This site contains by far the largest number of recorded archeological sites of any Special Landscape because it overlaps a portion of the Glenwood archaeological area, with its concentration of Nebraska Phase (or Glenwood Culture) sites. As many as 1,000 Nebraska Phase earthlodges may have existed in the Glenwood locality, representing perhaps 300 years of prehistoric human occupation (ca. 1000 A.D. - 1300 A.D.) by farming people who were culturally similar to nearby groups in today's Nebraska, Missouri, and Kansas.

Two protected parcels are found within this site: The Nature Conservancy's 261-acre Folsom Point Prairies and the Mills County Conservation Board's 273-acre West Oak Forest. Together, these protect about 10 percent of the site and 10 percent of the site's prairies. Over 90 percent of the area is in private landownership. With the landscape's close proximity to Council Bluffs, urban sprawl poses a major threat to the landscape. This area is also experiencing severe pressure from the excavation of loess for fill-dirt.

11. Bur Oak Ridge

This 6,000-acre high, steep, rugged, westerly bluffline and upland in Mills and Fremont Counties represents the dissected, heavily wooded terrain that typifies the southern Loess Hills, but it also contains a greater concentration of very small, prairie-capped ridges than most other southern sites. Prairies cover a mere 10 percent of the land, with forests dominating nearly half of the landscape. Mature, diverse, high-quality forest remnants may exist in the site's short, high-gradient ravines. Prairie-topped ridgelines, with their fringes of bur oak savanna, afford some beautiful vistas.

This landscape includes the southern tip of the Glenwood Archaeological Area. Public lands in this landscape are limited to a single small (53 acre) site, a hillside portion of the Iowa Department of Natural Resources' Forney Lake Wildlife Area.

12. Waubonsie

The 4,249-acre Waubonsie Special Landscape stretches along the westernmost bluffs in southern Fremont County, near the southern terminus of Iowa's Loess Hills. The site is characterized by rugged highly dissected uplands with pencil-thin ridgecrests, very large, steep, western bluffs facing the Missouri River valley, and mature, undisturbed oak forests. Long thin prairies (covering in all eight percent of the landscape) string along the ridgetops, spill over onto dry south- and west-facing slopes, and span some of the massive western bluff faces. Former bur oak savanna areas on upper hillsides, still recognizable by their large open-grown trees, are now largely overgrown. Certain deep valleys are known to contain mature forest communities dominated by very large bur and white oaks with individuals exceeding 200 years of age. All woodlands combined cover 56 percent of the site, more than any other Special Landscape. This area boasts bobcats, paw paw trees, zebra swallowtail butterflies, and other rare Iowa species that reflect the woodland dominance of the southern Loess Hills.

About a fifth of the Special Landscape Area falls within the boundaries of its sole publicly owned portion, Waubonsie State Park. This park safeguards 22 percent of the landscape's prairies. Although state park status has protected prairies for decades, management through burning and cutting brush has begun only in the last few years.

Table D-1: Land Cover and Protection in the Loess Hills Special Landscape Areas

	Total Acres	Prairie[1]		Amount of Prairie Protected[2]		Other Land Cover[3]						Land in Non-Private Ownership[2]	
						Grasslands		Woody		Row Crops			
		acres	%	acres	%	acres	%	acres	%	acres	%	acres	%
***1.* Plymouth North**	***9,929***	***2,458***	***25***	***1,455***	***59***	***7,984***	***80***	***1,270***	***13***	***640***	***6***	4,200	39
2. Plymouth South	***13,549***	***4,481***	***33***	***195***	***4***	***10,062***	***74***	***2,676***	***20***	***767***	***6***	1,180	9
3. Luton	***1,941***	***599***	***31***	***0***	***0***	***1,458***	***75***	***372***	***19***	***68***	***4***	0	0
4. Grant Center	***5,364***	***1,164***	***22***	***0***	***0***	***3,861***	***72***	***761***	***14***	***703***	***13***	0	0
5. Turin	***15,049***	***2,776***	***18***	***496***	***18***	***9,353***	***62***	***3,446***	***23***	***1,958***	***13***	2,839	19
6. Little Sioux	***23,736***	***3,774***	***13***	***697***	***18***	***12,236***	***52***	***6,941***	***29***	***4,413***	***19***	5,814	24
7. Mondamin	***5,394***	***681***	***13***	***126***	***18***	***2,755***	***51***	***1,634***	***30***	***956***	***18***	1,086	20
8. Loveland	***3,828***	***521***	***13***	***119***	***23***	***1,542***	***40***	***1,983***	***52***	***279***	***7***	910	24
9. Council Bluffs North	***5,021***	***756***	***15***	***0***	***0***	***2,087***	***42***	***2,440***	***49***	***393***	***8***	0	0
10. Folsom Point	***5,936***	***597***	***10***	***58***	***10***	***2,730***	***46***	***2,303***	***39***	***616***	***10***	534	9
11. Bur Oak Ridge	***6,000***	***600***	***10***	***3***	***1***	***2,534***	***42***	***2,770***	***46***	***510***	***9***	53	1
12. Waubonsie	***4,249***	***338***	***8***	***73***	***22***	***1,485***	***35***	***2,369***	***56***	***302***	***7***	795	19
Total: All Special Landscape Areas	***99,997***	***18,745***	***19***	***3,221***	***17***	***58,088***	***58***	***28,966***	***29***	***11,605***	***12***	17,059	17
Entire Landform Region	***649,906***	***22,249***	***3***	***3,400***	***15***	***327,339***	***50***	***73.432***	***11***	***231,223***	***36***	26,600	4

[1] data from Selby (2000), using 1980 infrared photos. [2] data calculated by digitizing maps collected from all public and non-profit agencies, September 2000, Iowa Dept. of Natural Resources, Geological Survey Bureau. [3] data from Iowa Department of Natural Resources (1992). "Grasslands" include pastures of brome, alfalfa, orchard grass or other species, hayfields, and prairies and other areas with and without shrubs or scattered trees. "Woody" areas include forests, woodlands, and shrublands of all types and ages. Note that additional minute percentages categorized as barren, artificial, or water have been ignored.